CHROMOSOME NUMBERS IN THE TRIBE PAPPOPHOREAE (GRAMINEAE)

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In a recent paper, Reeder (1965) pointed out that on the basis of anatomical characters of the leaf and embryo, the tribe Pappophoreae can be divided into two rather distinctive subgroups. One of these, which includes only the genus *Pappophorum,* was designated subtribe Pappophorinae. The other, comprising the genera *Cottea, Enneapogon, Kaokochloa,* and *Schmidtia,* was named subtribe Cottinae. In the paper referred to above, the cytology of members of the tribe Pappophoreae was not discussed.

Cytological information on members of this tribe published to date suggests that basic chromosome numbers of both $x = 9$ and $x = 10$ occur. Apparently the only species of *Pappophorum* which have been examined cytologically are *P. bicolor* Fourn. and *P. mucronulatum* Nees. For both of these, Brown (1950) and Gould (1958; 1966) have indicated that the chromosomes are in multiples of ten. The lowest number reported in either species is $2n = 40$.

The only published record for the monotypic genus *Cottea* is that of Covas (1945). He examined Argentinian material of *C. pappophoroides* Kunth, and reported $2n = 20$.

One Indian, four African, and one American species of *Enneapogon* have been subjected to cytological study. Covas (1945) reported $2n = 20$ in Argentinian material of *E. desvauxii* Beauv. (as Pappophorum *wrightii* S. Wats.). This number has been confirmed by Gould (1960, 1966) and Reeder (1967) in collections from Mexico and the United States. A diploid number of $2n = 20$ was also determined for *E. elegans* (Nees) Stapf by Janaki-Ammal (in Darlington & Wylie, 1956). For *E. scoparius* Stapf, de Wet (1954) listed $2n = 36$. Although basic numbers of $x = 9$ and $x = 10$ are common in grasses related to *Enneapogon,* curiously de Wet concluded that in this genus the basic number is $x = 12$. This would imply, of course, that his plant was triploid. In a later paper, de Wet & Anderson (1956) record the same number ($2n = 36$) for *E. scoparius,* and also for *E. cenchroides* (Licht.) C. E. Hubbard, and *E. brachystachys* (Jaub. & Spach) Stapf. For *E. pretoriensis* Stent, they report a chromsome number of $2n = 18$. On the basis of this latter count, the authors suggest that the basic number in *Enneapogon* is probably $x = 9$. Thomas (in Darlington & Wylie, 1956) also gives $2n = 36$ as the chromsome number for *E. cenchroides.*

The two published chromsome counts for the genus *Schmidtia* are by de Wet & Anderson (1956) and de Wet (1958). These authors report $2n = 36$ in *S. glabra* Pilger, and also in *S. bulbosa* Stapf. Laurent (1965), in a careful revision of the genus *Schmidtia,* treats both of the above taxa as synonyms of *S. pappophoroides* Steud.

TABLE I. CHROMOSOME NUMBERS IN PAPPOPHOREAE*

	Root-tip	PMC	Authority
		PAPPOPHORINAE	
Pappophorum			
bicolor	40, 60		Brown (1950)
"		100	Gould (1958, 1966)
mucronulatum	60		Brown (1950)
"		60	Gould (1966)
		COTTINAE	
Cottea			
pappophoroides	20		Covas (1945)
"		**20**	
Enneapogon			
brachystachys	36		de Wet & Anderson (1956)
cenchroides	36		de Wet & Anderson (1956)
"		36†	Thomas (in Darlington & Wylie, 1956)
"	**40**	**40**	
desvauxii	20		Covas (1945)
"		20	Gould (1960, 1966)
"		20	Reeder (1967)
elegans		20†	Janaki-Ammal (in Darlington & Wylie, 1956)
pretoriensis	18		de Wet & Anderson (1956)
"	18		de Wet (1958)
scoparius	36		de Wet (1954, 1958)
"	36		de Wet & Anderson (1956)
Kaokochloa			
nigrirostris	**22**	**22**	
Schmidtia			
pappophoroides	36		de Wet & Anderson (1956)
"	36		de Wet (1958)
"	**40**	**40**	

* All listed as 2*n*. Those in boldface are new counts by the authors.
† No information as to part of plant examined.

No cytological studies have been reported thus far for the monotypic genus *Kaokochloa*. This distinctive species is apparently confined to the Kaokoveld district of South West Africa, and was described only in 1961.

In view of the fact that within the subtribe Cottinae there appeared to be two basic chromsome numbers, sometimes both within the same genus, additional cytological studies seemed desirable. Through the courtesy of B. de Winter of Pretoria, South Africa, we have recently received caryopses of *Enneapogon cenchroides, Schmidtia pappophoroides,* and *Kaokochloa nigrirostris* de Winter. Plants of all three species have been grown successfully in our greenhouse and experimental gar-

FIGS. 1–6. Chromosome configurations; 1, 3, 5, 6, meiotic chromosomes from Division I of microsporocytes; 2, 4, somatic chromosomes from mitosis in root-tips; 1, *Enneapogon cenchroides,* diakinesis (2n = 40); 2, *E. cenchroides,* metaphase (2n = 40); 3, *Schmidtia pappophoroides,* anaphase (2n = 40); *S. pappophoroides,* metaphase (2n = 40); 5. *Kaokochloa nigrirostris,* diakenesis (2n = 22); 6. *Cottea pappophoroides,* anaphase (2n = 20), all × 900.

den. Chromsomes were studied in squashes of both pollen mother cells and root-tips.

Our investigations indicate that in *Enneapogon cenchroides* the chromosome number is 2n = 40 (figs. 1 & 2), and not 2n = 36, as reported by previous workers. Some irregularity was noted in meisosis, and univalents and multivalents were sometimes seen at diakinesis. The unexpected number of 2n = 22 was determined for *Kaokochloa.* Despite this, meiosis appears to be quite normal and eleven bivalents form regularly at diakinesis (fig. 5). *Schmidtia* proved to be tetraploid with 2n = 40 (figs. 3 & 4). This count is at variance with previous reports of 2n = 36 for this genus. As indicated above, although de Wet & Anderson (1956) and de Wet (1958) used the names *S. bulbosa* and *S. glabra,* Laurent (1965), in his monograph, considers both of these to be synonyms of *S. pappophoroides.*

In addition to the cytological studies reported above, we have also examined meiosis in microsporocytes of *Cottea pappophoroides* from Mexico. Our count of 2n = 20 (fig. 6) agrees with that given by Covas (1945), whose material came from Argentina. No irregularities were observed in meiosis.

Our cytological studies of representatives of all four genera of the subtribe Cottinae, therefore, indicate that in this group the basic chromosome number is x = 10. In one species each of *Cottea* and *Enneapogon* we found 2n = 20. Tetrapoid numbers of 2n = 40 were determined in *Schmidtia,* and a second species of *Enneapogon.* In *Kaokochloa,* it is true, we found 2n = 22, but it seems reasonable to interpret this as a case of aneuploidy, and to consider that the basic chromsome number in this genus is x = 10 also. In view of the close morphological and anatomical similarities between this genus and *Schmidtia,* a basic number of x = 11 in *Kaokochloa* appears unlikely. A cytological reexamination of those species of *Enneapogon* in which counts of 2n = 18 and 2n = 36 have been reported seems desirable. The information on chromosome numbers in members of the Pappophoreae is summarized in Table I.

List of Species Studied and Sources of Material

Cottea pappophoroides Kunth. Mexico: Chihuahua, 23 miles NW of Zavalza, *J. & C. Reeder 4587,* 3 October 1966, YU.

Enneapogon cenchroides (Licht.) C. E. Hubbard. South Africa: Pretoria, Pyramid. Seeds from above locality supplied by B. de Winter, and plants grown in experimental garden at Yale University, *J. & C. Reeder 4551,* 16 July 1966, YU. Determination verified at Kew.

Kaokochloa nigrirostris de Winter. South West Africa: Kaokoveld. Seeds from above area supplied by B. de Winter, and plants grown in experimental garden at Yale University, *J. & C. Reeder 4244,* 5 July 1965, YU.

Schmidtia pappophoroides Steud. South West Africa: Gobabis. Seeds from above area [collected by H. Tölken] supplied by B. de Winter, and plants grown in greenhouse at Yale University, *J. & C. Reeder 4821,* April 1967, YU.

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SOME ADDITIONS TO THE FLORA OF TEXAS—IV

Donovan S. Correll

As work progresses on a Manual of the vascular plants of Texas, which Marshall C. Johnston and I are engaged in preparing, additions to the flora of the state are being continually found as evidenced by those reported here and which have been reported elsewhere. (Some Additions and Corrections to the Flora of Texas. Wrightia 3:126–140. 1965; Some Additions and Corrections to the Flora of Texas—II. Brittonia 18:306–310. 1966; and —III. Rhodora 68:420–428. 1966). This project is being supported, in part, by a grant from National Science Foundation (GB-3138). All of the specimens cited, unless otherwise noted, are in the Lundell Herbarium (LL) of Texas Research Foundation. I wish to acknowledge the help of my wife, Helen B. Correll, in the preparation of this paper.

Setcreasea leiandra (Torr.) Pilg. var. **glandulosa** Correll, var. nov. Planta var. *leiandrae* similis; pedicelli cum pilis brevibus glanduliferis vice villorum nitidorum.

Those plants that are found about Capote Falls and along Capote Creek in Presidio Co. and have short glandular hairs on their pedicels instead of the characteristic long silky hairs are referred to this variety.

Presidio Co., on ledges of cliffs above Capote Falls, in clumps, perennial, Nov. 3, 1966, *D. S. Correll 34128* (holotype, LL); Capote Creek, Sept. (Oct.) 1883, *V. Havard* 79 (GH, US).

Nolina arenicola Correll, sp. nov. Caulis florifer ad 1 m altus (inflorescentia includenti); folia numerosa caespitem magnum formantia, circa 1.3 m longa, 5 mm lata, complanata vel cancavo-convexa, marginibus rasilibus; panicula composita, aliquantum aperta, ramis grossis effusis vel patulo-ascendentibus; rami cum ramulis curtis; bracteae non conspicuae, plerumque ramos primarios fere aequantes vel leviter superantes; perianthium 2.5–3.5 mm longum, segmentis ovato-ellipticis; fructus 4–7 mm lati, cum incisura profunda ad apicem; stylus prominens; pedicelli fructiferi 5–7 mm longi, prope basim articulati in fruc-